REMARKS

The Office Action dated December 17, 2004 has been received and carefully noted. The following remarks, and the above amendments to the claims, are submitted as a full and complete response thereto.

Claims 1-40 are pending in the present application and are submitted for consideration.

As a preliminary matter, the Office Action indicated that claims 3-5, 11-15, 18-20, 25, 26, 32 and 36-40 were allowed. Applicants acknowledge with appreciation the indication of the allowed claims.

Claims 1, 2, 6-10, 16, 17, 21-24 and 27-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication 2002/0089933 (Giroux et al.) in view of U.S. Patent No. 5,901,140 (Van As et al.). The Office Action took the position that Giroux taught all the elements of these claims, except determining whether the associated receive port is currently saturated. The Office Action then cited Van As as teaching the elements of the claims missing from Giroux. Applicants respectfully traverse and submit that the cited references, either alone or in combination, do not disclose or suggest all the features of any of the presently pending claims.

Claim 1, from which claims 2 and 6-10 depend, recites a shared memory packet switching device having a plurality of receive ports for receiving data packets, and a plurality of transmit ports for transmitting data packets. The switching device includes a shared memory providing a shared memory space for temporary storage of data packets

received via the receive ports, a plurality of input logic units with each of the input logic units being associated with one of the receive ports, and with each of the input logic units being operative to determine whether the associated receive port is saturated by determining whether a number of packets received via the associated receive port and currently stored in the shared memory exceeds a predetermined drop threshold value, a packet routing control unit communicatively coupled with the input logic units, and being operative to determine a destination one of the transmit ports for each of the received data packets and at least one output logic unit associated with at least one of the transmit ports, the output logic unit being communicatively coupled with the packet routing control unit, and being operative to determine whether the associated transmit port is congested by determining whether a number of packets currently stored in the shared memory that are to be transmitted via the associated transit port exceeds a predetermined congestion threshold value, and also being operative to generate an associated output full signal indicative of whether the associated transmit port is congested. The input logic units is responsive at least in part to each of the output full signals, and is further operative to cause a selected packet received via the associated receive port to be dropped if the associated receive port is currently saturated and the output full signals indicate that a destination transmit port associated with the selected packet is currently congested.

Claim 16, from which claims 17 and 21-24 depend, recites a shared memory packet switching device having a plurality of receive ports for receiving data packets, and a plurality of transmit ports for transmitting data packets. The packet switching device

includes a shared memory providing a shared memory space for temporary storage of data packets received via the receive ports, a plurality of input logic units with each of the plurality of input logic units being associated with one of the receive ports, and with each of the input logic units being operative to determine whether the associated receive port is saturated by determining whether a number of packets received via the associated receive port and currently stored in the shared memory exceeds a predetermined drop threshold value, a packet routing control unit communicatively coupled with the at least one input logic unit, and being operative to determine a destination one of the transmit ports for each of the received data packets, the packet routing unit being further operative to generate a plurality of transmit signals each being associated with one of the transmit ports, and to assert a particular one of the transmit signals when a received packet is to be transmitted via the associated transmit port and at least one output logic unit associated with at least one of the transmit ports, the output logic unit being communicatively coupled with the packet routing control unit, and being operative to determine whether the associated transmit port is congested by determining whether a number of packets currently stored in the shared memory that are to be transmitted via the associated transit port exceeds a predetermined congestion threshold value, and also being operative to generate an associated output full signal indicative of whether the associated transmit port is congested. The packet routing control unit is also responsive to the output full signals, and is operative to generate a plurality of filter signals for indicating that a received packet is destined for a congested one of the transmit ports. The input logic units is

further responsive to each of the filter signals, and is further operative to cause a selected packet received via the associated receive port to be dropped if the associated receive port is currently saturated and the filter signals indicate that a destination transmit port associated with the selected packet is currently congested.

Claim 27, from which claims 28-31 and 33-35 depend, recites a process of controlling the flow of data through a shared memory packet switching device having a plurality of receive ports for receiving data packets, a plurality of transmit ports for transmitting data packets, and a shared memory providing a shared memory space for temporary storage of data packets received via the receive ports. The method includes the steps of receiving a packet via an associated one of the receive ports, determining whether the associated receive port is currently saturated by determining whether a number of packets received via the associated receive port and currently stored in the shared memory exceeds a predetermined drop threshold value, determining a destination one of the transmit ports associated with the received data packet, determining whether the destination transmit port is currently congested by determining whether a number of packets currently stored in the shared memory that are to be transmitted via the destination transmit port exceeds a predetermined congestion threshold value and dropping the received packet if the associated receive port is currently saturated and the destination transmit port is currently congested.

As recited in the present specification, examples of the present invention enable an uncongested transmit port of the device to not starve as a result of flow control functions

initiated at a saturated receive port as a result of heavy traffic through the device between the saturated receive port and a plurality of transmit ports including the uncongested transmit port and other transmit ports, some of which may be congested. It is respectfully submitted that the cited references, taken either individually or in combination, fail to disclose or suggest all of the elements of the presently pending claims. Therefore, it is further submitted that the cited references fail to provide at least the above-discussed advantages of the claimed invention.

Giroux, as discussed in the previous Response, relates to congestion management in a multi-port shared memory switch. Giroux describes a switch receiving data from various sources and temporarily storing the data in a shared memory buffer. The switch also includes a local congestion monitoring means for setting and monitoring queue length thresholds for each output queue. The Office Action states that Giroux fails to disclose or suggest determining whether the associated receive port is currently saturated.

Van As relates to a selective congestion control mechanism for information networks. Van As describes an extended input-port module to react immediately to congestion notifications from output ports of the local switching node and from downstream nodes. Referring to Figure 2, if output port 7^3 of switch 3 becomes congested, the congestion is detected by the link buffer occupancy exceeding a given threshold. As a result, output port 7^3 notifies all the input ports 8 of the switch to hold back all cells that will flow via bottleneck link 5. If traffic to output port 7^3 of switch 3 is held back at input ports 8, some queues at the input side will fill up. As a result, a throttle

cell is created to inform the switching nodes upstream that the traffic leading to congestion should be throttled. The throttle cell is sent to upstream switch 2 via output port 7^2 of switch 3 and arrives in switch 2 via input port 10^1.

Applicants submit that Giroux and Van As, either alone or in combination, do not disclose or suggest all the features of the pending claims. For example, the cited references do not disclose or suggest "a plurality of input logic units with each of the input logic units being associated with one of the receive ports, and with each of the input logic units being operative to determine whether said associated receive port is saturated by determining whether a number of packets received via said associated receive ports and currently stored in said shared memory exceeds a predetermined drop threshold value," as recited in claims 1 and 16. Claim 27 recites the patentable features of claims 1 and 16, but is drawn to a process of controlling the flow of data through a shared memory packet switching device. Applicants respectfully submit that the cited references, either alone or in combination, do not disclose or suggest at least these patentable features of the pending claims.

Applicants submit that the congestion control and management taught by Giroux and Van As do not disclose or suggest "a plurality of input logic units . . . associated with one of the receive ports . . . and . . . being operative to determine whether said associated receive port is saturated," as discussed above. The Office Action states that Giroux does not disclose or suggest at least this patentable feature. Van As also does not disclose or suggest at least these features. Van As describes an output port, such as port 7^3,

determining the existence of congestion. This congestion is then reported to the input port, which, in turn, notifies the upstream nodes Van As does not disclose or suggest having input logic units at its input ports to determine congestion, or saturation, of the receive port. Further, the "throttle cell" of Van As does not disclose or suggest these features of the claims. The throttle cell is created once the output port determines congestion, and is used to inform the switching nodes upstream. This aspect of Van As does not disclose or suggest determining whether a number of packets received via the associated receive port and currently stored in the shared memory exceeds a predetermined value. Moreover, the throttle cell is created upon congestion being detected at an output port, and not a receive port. This creation condition does not disclose or suggest the input logic units, as recited. Thus, Applicants respectfully submit that the cited references, either alone or in combination, do not disclose or suggest at least these features of the pending claims.

With regard to claim 16, the Office Action also states that "neither Giroux nor Van As expressly discloses generating filter signals for indicating that a received packet is destined for a congested one of the transmit ports." The Office Action then alleges "it would have been obvious to generate one of those signals in the combined system of Giroux and Van As" because "one would have been motivated to do this because sending this filter signal and informing the system that the packet will be dropped if it's continued to be sent will save on resources that could be used for other packets." Applicants submit that this feature also is not disclosed or suggested by the cited references, either alone or

in combination, and that no evidence is provided to modify the references, to achieve the claimed invention.

The Office Action does not provide any evidence to support this reasoning, either in the prior art or in the knowledge generally available to one of ordinary skill in the art. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP 2143.01. As stated in the Office Action, the cited references do not disclose or suggest generating filter signals for indicating that a received packet is destined for a congested transmit port. Applicants submit that Van As describes creating a throttle cell to inform upstream switching nodes that traffic leading to congestion should be throttled. Signals in Van As are not sent to input logic units at a receive port. In contrast , claim 16 recites "said input logic units being further responsive to each of said filter signals." Giroux and Van As do not disclose or suggest this feature of claim 16, and applicants submit that there is no evidence of a motivation or suggestion to combine or modify the cited references as alleged in the Office Action, either in the prior art or in the knowledge generally available to one of ordinary skill in the art, to achieve the claimed invention.

As for the dependent claims, applicants submit that these claims are not disclosed or suggested by the teachings of the cited references at least for the reasons given above, and because the dependent claims recite additional patentable subject matter. Thus, applicants respectfully request that the obviousness rejection of claims 1, 2, 6-10, 16, 17, 21-24 and 27-29 be withdrawn.

Claims 30, 31 and 33-35 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Giroux in view of Van As, and further in view of U.S. Patent No. 5,787,071 (Basso et al.). The Office Action took the position that Giroux and Van As taught all the elements of these claims except asserting a backpressure signal when a backpressure threshold has been exceeded and the lines are bi-directional. Basso was cited as teaching these elements of the claims. Applicants submit that the cited references, either alone or in combination, do not disclose or suggest all the features of any of the presently pending claims.

Claims 30, 31 and 33-35 depend directly or indirectly from claim 27. Claim 27 is summarized above. Applicants submit that claims 30, 31 and 33-35 recite the patentable features of claim 27 discussed above.

Basso relates to a hop-by-hop flow control in an ATM network. Basso describes traffic between nodes being set up by a reserved bandwidth service and/or non-reserved bandwidth service. The non-reserved bandwidth service is controlled by a hop by hop backpressure mechanism. When the traffic entering a node exceeds a high threshold, the backpressure mechanism generates stop backpressure primitives in order to throttle the entering traffic. In case of congestion, the mechanism is either able to selectively interrupt the connection contributing to the congestion without affecting the rest of the link traffic, or to globally stop all link traffic.

Applicants submit that Basso does not disclose or suggest those features of the claims missing from Giroux and Van As. Specifically, the cited references do not

disclose or suggest "determining whether said associated receive port is currently saturated by determining whether a number of packets received via said associated receive port and currently stored in the shared memory exceeds a predetermined drop threshold value," as recited in claim 27. Applicants submit that the hop-by-hop control mechanism of Basso does not disclose or suggest these features. Thus, the cited references, either alone or in combination, do not disclose or suggest all the features of the presently pending claims.

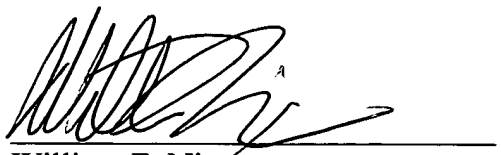
Further, even if Basso were accepted as teaching what has been suggested, which applicants do not admit, Basso would not cure the deficiencies of the Giroux and Van As, as discussed above. Thus, applicants respectfully request that the obviousness rejection of claims 30, 31 and 33-35 be withdrawn.

It is respectfully submitted that each of claims 1-40 recite subject matter that is neither disclosed nor suggested by the cited references, either alone or in combination. As such, reconsideration and withdrawal of the all rejections are respectfully requested and this application be allowed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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